ZHONE™

4000E IP Broadband Loop Carrier
Installation Instructions

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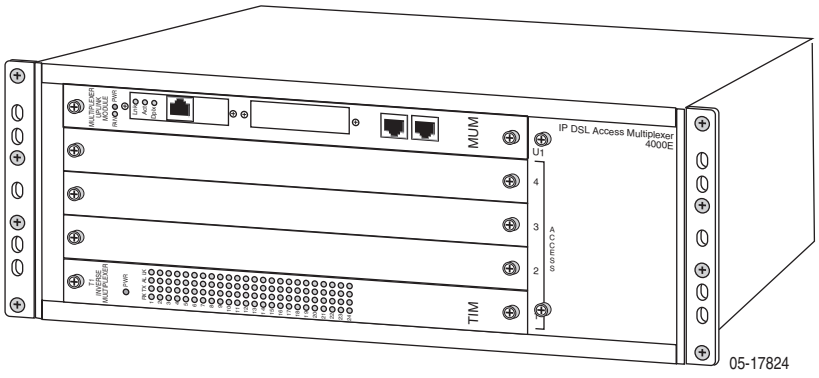
Introduction

The 4000E IP Broadband Loop Carrier (BLC) provides a high capacity and native IP Ethernet foundation for a variety of feature-rich multi-service access mulitplexer modules.

The 4000E BLC features a high capacity backplane delivering up to 8 Gbps throughput, and providing a non-blocking architecture for even the highest bandwidth broadband access technologies, such as ADSL2+. It supports a single uplink, management, and switching module connected to the dual backplanes with redundant modular backhaul/uplink ports to support 10/100 Ethernet, GigE (copper or fiber), T1/E1, and dual bonded T1/E1 uplink modules.

The 4000E BLC is environmentally hardened for installation in Remote Terminals or street cabinets. For flexibility of installation the 4000E BLC has removable mounting brackets that can be placed in increments of 1.45” up to 9.28” from the front of the chassis, allowing for multiple installation options in either 19" or 23" equipment racks.



Unpacking and Inspecting the Equipment

⚠ HANDLING PRECAUTIONS FOR STATIC-SENSITIVE DEVICES

This product is designed to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment. If you are not sure of the proper static control precautions, contact your nearest sales or service representative.

The following components should be included in the shipping container:

- 1 – 4000E BLC with 1 fan module and 12 slot covers
- 4 – Rubber Bumper Screws
- 2 – Rack Mount Brackets (either 19" or 23", as ordered)
- 10 – #6 Phillips Bracket Screws
- 8 – #10 Phillips Rack Screws
- 8 – #12 Phillips Rack Screws

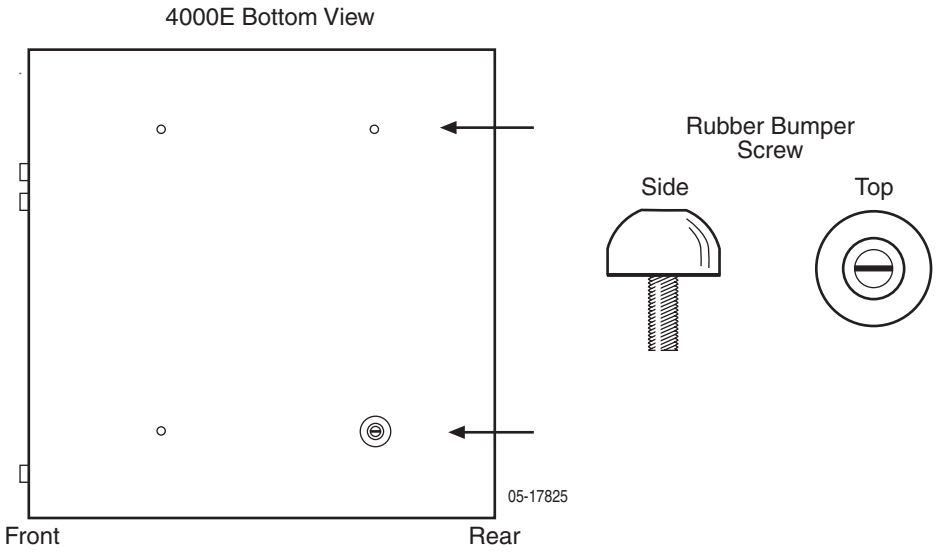
If there is visible damage, do not attempt to connect the device. Contact your sales representative.

Installation Options

The 4000E BLC is designed for installation in a Restricted Access area where admittance is limited to trained and authorized service personel. It may be installed on a tabletop or in a rack.

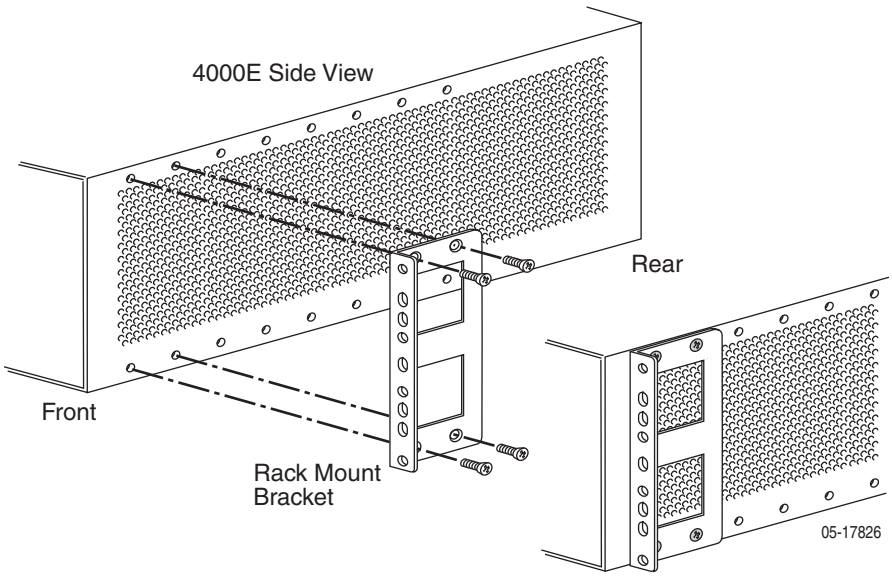
Installation on a Tabletop

Insert the four provided rubber bumper screws into the mounting holes at the bottom of the 4000E chassis for surface grip and airflow. Position and secure all connecting cables such that they will not become a tripping hazard or pull loose from the chassis. Ensure that the air supply vents around the top and bottom edges of the chassis are not blocked.

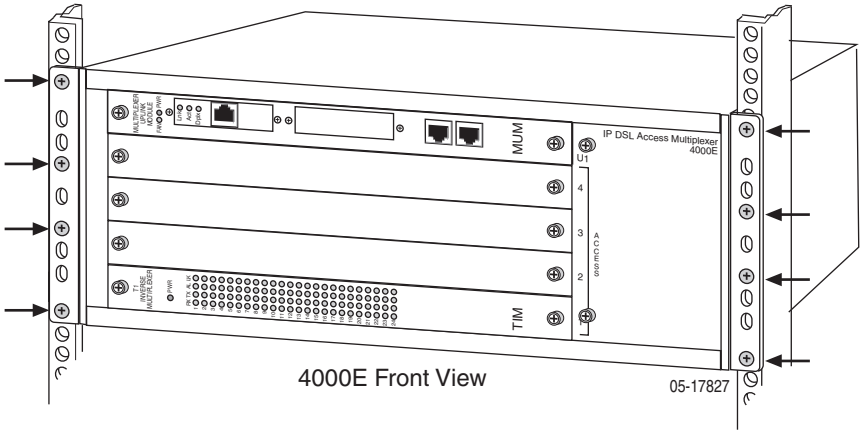


Installation in a Rack

Using a Phillips Screwdriver, attach the two provided rack mount brackets to the sides of the 4000E with eight of the ten provided bracket screws. There are seven position options for the rack brackets; position them as best suited to the space available for your chassis on the rack being utilized.



Mount the chassis onto the rack and secure the rack mount brackets to the sides of the rack using one of the two provided sets of eight [8] rack screws (whichever size fits the rack being utilized).



Check the rack for stability, ensuring that installation of the 4000E has not caused the rack to become top-heavy.

Installing Your Management Module

A management module provides the functional control for the 4000E BLC; the 4000E cannot function without one. There are several different models available. Contact your sales representative.

Installing a Management Module

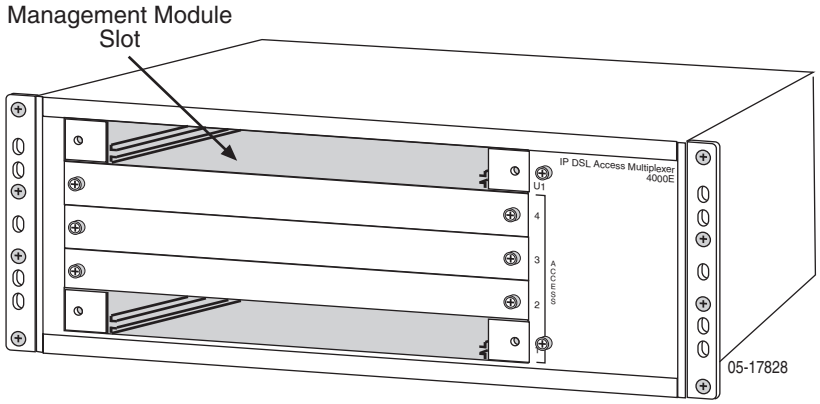
An uplink module provides the upstream network connection for the 4000E BLC; a management module cannot function without one. Depending on the management module model that you plan to install in your 4000E, you will need either a Media Interface Module (MIM) or an Uplink Interface Module (UIM). Only one uplink module is required for operational purposes. However, two uplink modules may be installed, one in each port of the management module, if redundancy is desired. Refer to your management module or uplink module installation instructions for further information.

CAUTION

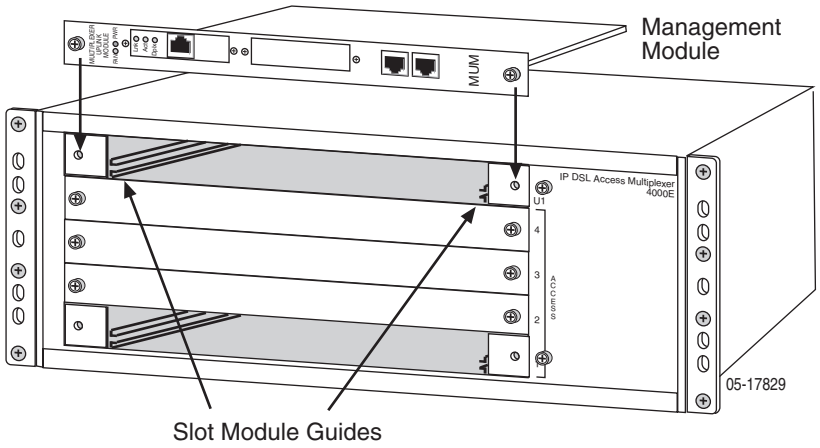
If a slot cover is removed from a management module uplink port, it must be replaced with an uplink module. DO NOT OPERATE A 4000E WITH A MANAGEMENT MODULE THAT HAS AN OPEN UPLINK PORT.

1 Identify the appropriate slot for installation.

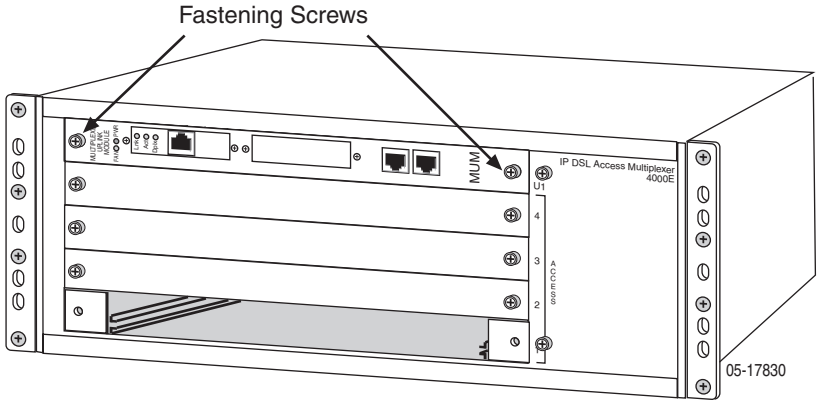
The 4000E is a five slot chassis: slots 1–4 are reserved for interface modules and Slot U1 is reserved for a management module. The 4000E is shipped from the factory with slots 1 and U1 open and ready for module installation.



2 Align the management module with the slot module guides. With the management module printed circuit board (PCB) facing up and the management module model name on the right side of the module faceplate (facing towards you), align the left and right edges of the PCB with the U1 slot module guides on the 4000E.



3 Slide the Management Module Firmly into the Chassis. Tighten the fastening screws on the management module faceplate.



Installing Your Interface Module(s)

Interface modules provide the subscriber connections for a 4000E BLC; up to four interface modules may be installed in the 4000E (in slots 1–4). There are a variety of models available. Contact your sales representative. Any combination of interface module models may be installed in an 4000E as long as they are supported by the model type and version number of your management module; refer to the Release Notes for your particular management module model.

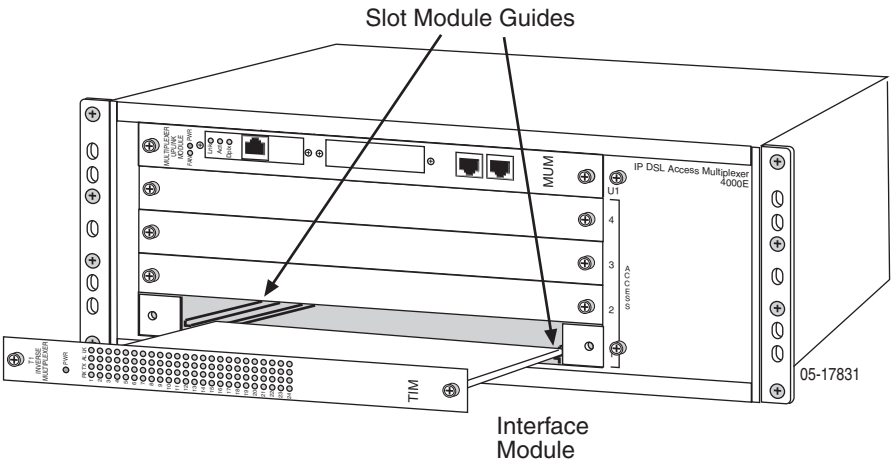
CAUTION

If a slot cover is removed from slots 2–4, it must be replaced with an uplink module. DO NOT OPERATE A 4000E WITH AN EMPTY MODULE SLOT.

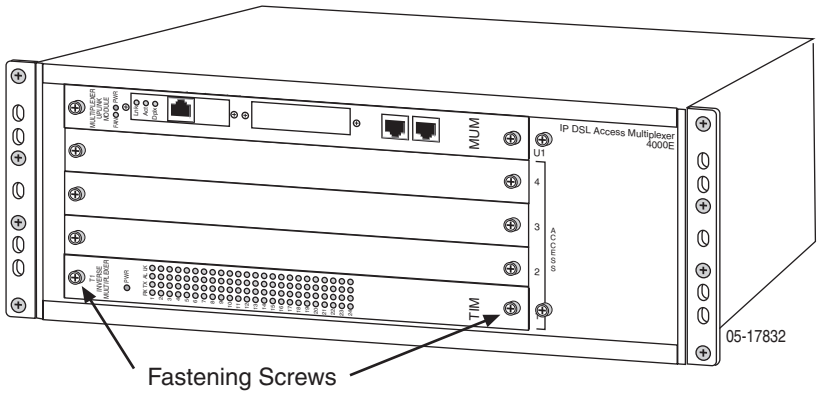
1 Select a Slot for Installation.

Although the 4000E is factory shipped with Slot 1 open, interface modules may be installed in any slot, 1–4.

2 Align the interface module with the slot module guides. With the interface module PCB facing up and the interface module model name on the right side of the module faceplate (facing towards you), align the left and right edges of the PCB with the slot module guides of the chosen slot on the 4000E.



3 Slide the interface module fFirmly into the chassis. Tighten the fastening screws on the interface module faceplate.



Powering Up Your 4000E BLC

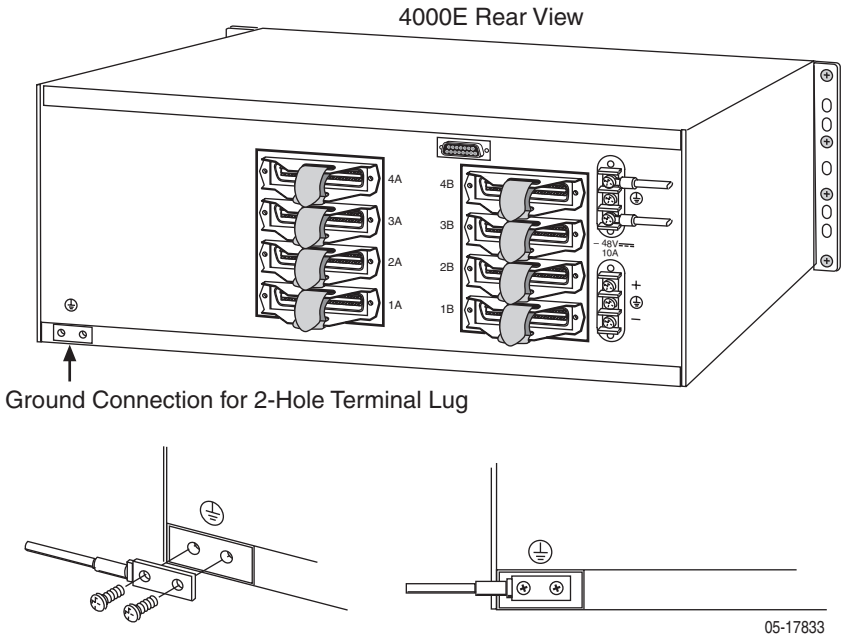
CAUTION:

Turn your DC power source(s) OFF until you have completed connection of the 4000E as outlined in the following sections.

Do not operate the 4000E without a ground connection.

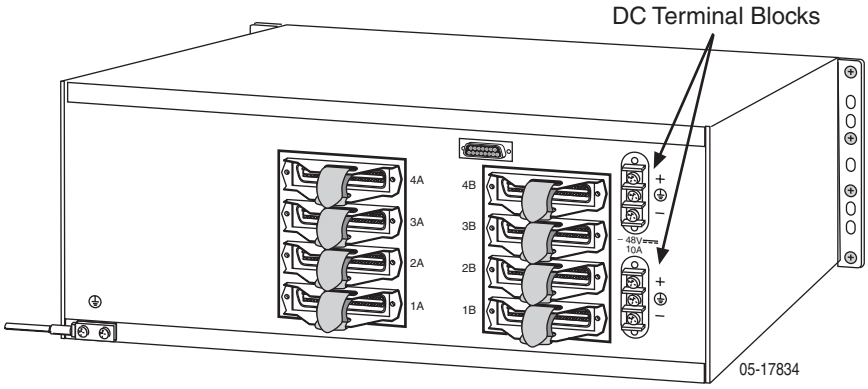
1 Connect a ground wire to the 4000E: Line up the 2-hole terminal lug of your ground wire with the two holes on the small, unpainted section on

the back of your chassis. Secure the terminal lug to the chassis with two #10-32 screws.



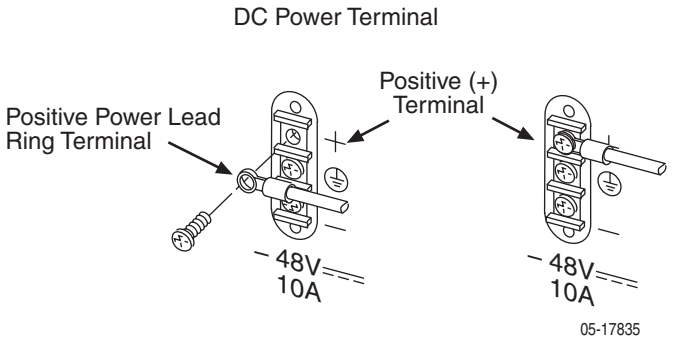
2 Connect the Ground Wire to a Frame Ground. Ground wire connection can vary from location to location, although typically all equipment in a Central Office is grounded to a common copper bus.

3 Select a Terminal Block. Either terminal block on the back of the 4000E may be used to power the chassis; only one terminal block is required for operational purposes. The two terminal blocks on the 4000E are independent feeds. Chassis power is supplied by only one terminal block at a time; the second supply is a backup. The two terminal blocks do not load-share; each terminal block must be supplied with adequate amperage to run the chassis independently.

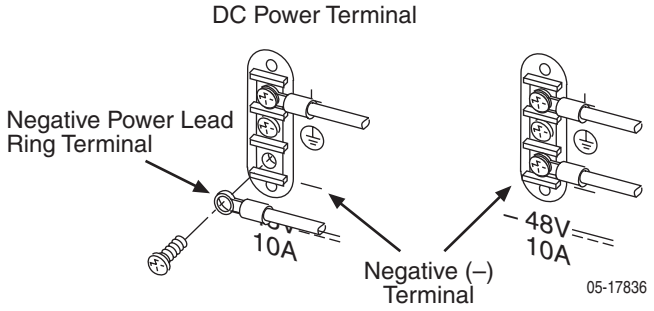


4 Select a terminal block. Using a Phillips Screwdriver, remove the upper screw from the chosen terminal block (labeled "+" on the chassis). Slide the ring terminal of your positive power lead around the shaft of the screw

and insert the screw into the same "+" terminal from which it was removed.



5 Remove the right-hand screw (labeled "–") from the same terminal block. Slide the ring terminal of your NEGATIVE lead around the shaft of the screw and insert the screw into the same "–" terminal from which it was removed.



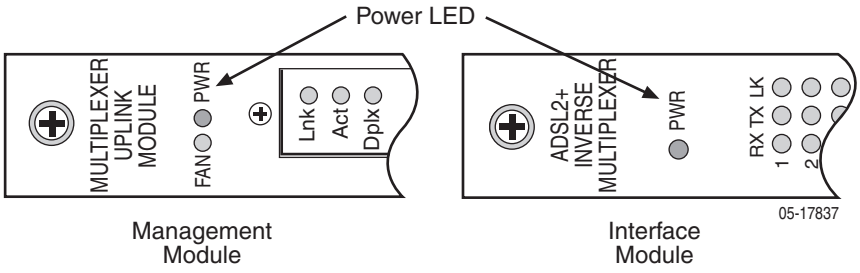
6 Connect both power leads to a fuse panel. The negative (–) lead connects to a "Batt" (Battery) terminal and the positive (+) lead connects to a "Return" terminal on your DC power supply.

CAUTION:

Observe proper polarity.

The power source(s) connected to the 4000E must be equipped with a disconnect device such as an On/Off switch. Otherwise, an appropriately rated circuit breaker must be installed on each power circuit to be used. In the case of an emergency, hazardous voltages will not be removed from the 4000E until all power sources have been either turned off or disconnected from the chassis.

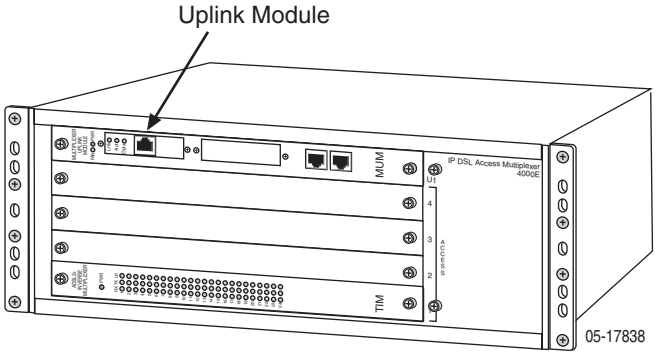
7 Turn your power source(s) on. The PWR (power) LED on both the interface module and management module faceplates will illuminate solid green to indicate the modules are receiving power.



Uplink Connections

No configuration is necessary for Uplink Interface Modules (UIMs) or Media Interface Modules (MIMs) installed on the management module in your 4000E to operate at default settings. However, if you wish to run your uplink connections at settings other than the UIM or MIM defaults, configure the UIM or MIM prior to making a connection.

For further connection and configuration information, refer to the installation instructions of your particular UIM or MIM model.

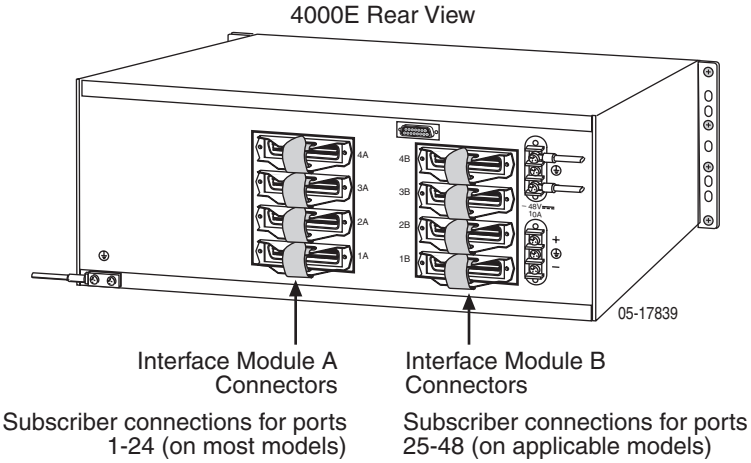


Subscriber Lines

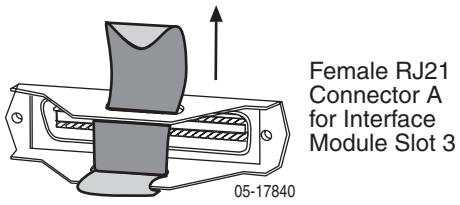
No configuration is necessary for the interface module(s) installed in your 4000E to operate at default settings. However, if you wish to run your subscriber connections at settings other than the factory defaults, configure the interface module(s) prior to connection. Refer to the installation instructions for your particular interface module(s).

The 4000E chassis supports ADSL, IDSL, SDSL and T1/E1 technologies. Ensure that the subscriber lines you are connecting correspond with the technology of the interface module(s) installed in your 4000E.

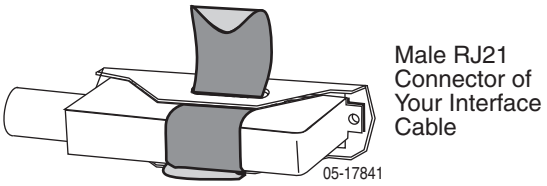
1 Identify the appropriate RJ21 Connector. Subscriber lines must be connected according to the 4000E slot in which the corresponding interface module was installed. Interface module slots 1–4 run from bottom to top; the corresponding RJ21 ports are directly behind each slot on the back of the chassis (1–4, bottom to top). Each interface module slot on the 4000E has two corresponding RJ21 connectors on the back of the chassis: the RJ21 connectors on the left (A) provide the subscriber connections for interface module ports 1–24 (on most models) and the RJ21 connectors on the right (B) provide the subscriber connections for interface module ports 25–48 (on applicable models). For the TIM1500-24 and EIM2000-24 interface modules, the A connectors provide the subcriber connections for ports 1-12 and the B connectors provide the subscriber connections for ports 13-24.



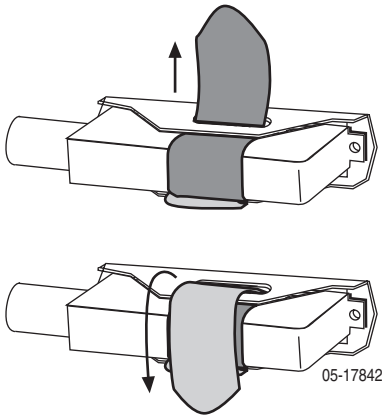
2 Detach the hook-and-loop fastener Strap from the female RJ21 connector port: lift the hook-and-loop fastener tab from the bottom and pull the strap upward to open, leaving it looped under the right side of the connector frame.



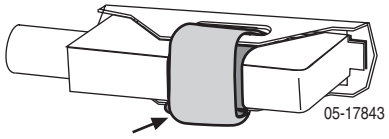
3 Slide the male RJ21 connector of your interface cable underneath the hook-and-loop fastener, from the left, and press it firmly into the female RJ21 connector port on the chassis.



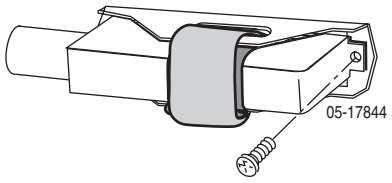
4 Pull the hook-and-loop fastener strap upward, making sure that it is snug against the connector, then pull the strap back down, such that the hook-and-loop fastener layers stick to one another across the top of the connector.



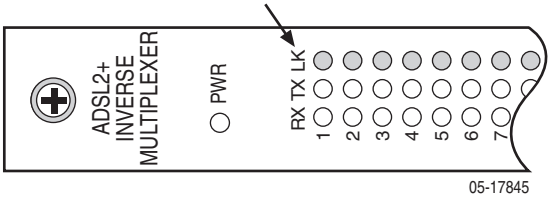
5 Tuck the tab at the end of the strap down between the connector frames so that it is out of the way of other connections.



6 Screw the right side of the RJ21 cable connector into the jack screw on the right side of the RJ21 connector frame on the chassis. Note: If you are using a 120 or 180 degree cable, both the right and left sides of the cable connector should be screwed to the RJ21 connector frame on the chassis.



The LK (Link) LED for each port being connected with a remote modem will illuminate solid or flashing green to indicate a connection has been established. Link up time between interface modules and remote modems can vary from one to five minutes depending on the quality, gauge and distance of the copper cable pair(s) being used. Refer to individual interface module user guides for specific information such as connector pinouts, parameter configurations and distance capabilities.



Securing the Connecting Cables

Position all connecting cables such that they will not become a tripping hazard or pull loose from the chassis; secure with cable ties or hook-and-loop fastener straps.

Configuration and Management

Although no configuration is necessary to run subscriber lines at the default settings, all 4000E parameter settings are software selectable via Command Line Interface (CLI), Simple Network Management Protocol (SNMP), and/or the Network Management System (NMS). 4000E management capabilities depend upon the management module model installed in your chassis. Once the management module has been initialized, the interface modules installed in your 4000E may also be configured as desired. Refer to the following for further information:

Table 1: User Documentation

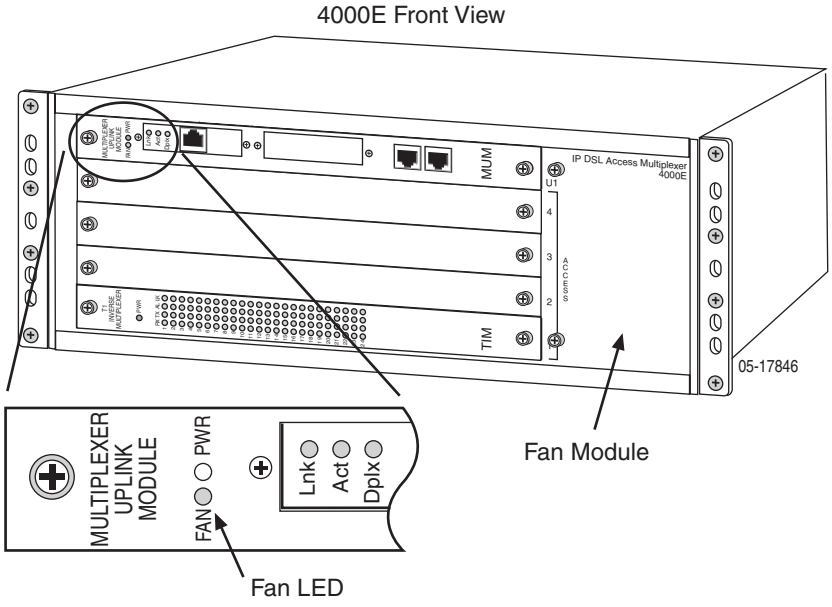
Document	Contents
Management module installation instructions (model-specific)	• module installation port pinouts parameter defaults parameter configuration options management system capabilities
Uplink module installation instructions (model-specific)	• module installation port pinouts parameter defaults parameter configuration options

Table 1: User Documentation

Document	Contents
Interface module user guides (model-specific)	• module installation distance and bandwidth capabilities port pinouts parameter defaults parameter configuration options
CLI Management User Guide	• management module initialization instructions command user guide command definitions configuration options common to all management module models configuration options common to all interface module models

Fan Module

The 4000E fan module is installed vertically to the right of the interface module slots. It comes pre-installed and should not be removed unless it is being replaced. Fan functionality is indicated by the FAN LED on your management module (all models): No illumination or solid green illumination indicates all fans are currently functioning, solid amber illumination indicates at least one of the four fans is no longer functioning.



CAUTION:

Do not operate the 4000E without a fan module or with a fan module that is not functioning properly.

Specifications

Table 2: Specifications

Specification	Criteria
Environment	Operating Temperature: –40° F to 149° F (–40° C to 65° C) Storage Temperature: –40° F to 158° F (–40° C to 70° C) Humidity: 5 % to 95 %, non-condensing Altitude: –200 ft to 16,500 ft (–60 m to 5,000 m)
Physical	7" High x 17" Wide x 18" Deep (17.8 cm High x 43.2 cm Wide x 46 cm Deep) 28 lbs (12.73 kg)
Power	–48 VDC 10 amps maximum Although actual power draw depends upon chassis configuration, a fully loaded chassis averages around 6 amps.
Regulatory Compliance	NEBS: GR-63-CORE; GR-1089-CORE EMC: FCC Part 15; CSA/C108.8; EN55022; EN55024 Safety: CSA 22.2 No. 60950-1-03; EN60950-1:2001; CE Marking Telecom: ACTA968 (Part 68); ICCS-03; TBR12; TBR13

⚠ Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.
3. **WARNING:** This unit supports a redundant 48 VDC power input connection. Disconnect both sources of input power before servicing.
4. This product is to be installed only in a Restricted Access Location (dedicated equipment rooms, equipment closets or the like) in accordance with articles 110-16, 110-17 and 110-18 of the National Electrical Code, ANSI/NFPA 70.
5. This product is to be connected to a 48 VDC SELV supply source that is electrically isolated from the AC source.
6. The positive terminal of the 48 VDC source is to be reliably connected to earth. Connect a green/yellow earthing (grounding) wire to the protective earthing (grounding) lug connector, identified by the protective earth symbol on the chassis.
7. A readily accessible disconnect device as part of the building installation shall be incorporated in fixed wiring. The disconnect device (a 48 VDC, 10 A, single pole circuit breaker or switch) must be included in the ungrounded supply conductor. Over current protection must be included with a 48 VDC, 10 A fuse or circuit breaker in the ungrounded conductor. Use minimum 16 AWG (2.5 mm^2) fixed power source wires with strain retention.
8. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.
9. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
10. General purpose cables are described for use with this product. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer. To reduce the risk of fire, use a UL Listed or CSA Certified, minimum No. 26 AWG (0.128 mm2) telecommunication cable, or comparable cables certified for use in the country of installation.
11. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are interconnected, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.
12. In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:
    - Never install telephone wiring during a lightning storm.

— Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

— Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

— Use caution when installing or modifying telephone lines.

— Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

— Do not use the telephone to report a gas leak in the vicinity of the leak.

13 The equipment is intended for installation in an environment that is free of dust and dirt.

14 When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.

15 **CLASS 1 LASER PRODUCT:** This product has provisions for the customer to install a Class 1 laser transceiver, which provides optical coupling to the telecommunication network. Once a Class 1 laser product is installed, the equipment is to be considered to be a Class 1 Laser Product (Appareil à Laser de Classe 1). The customer is responsible for selecting and installing the laser transceiver and for insuring that the Class 1 AEL (Allowable Emission Limit) per EN/IEC 60825 is not exceeded after the laser transponders have been installed. Do not install laser products whose class rating is greater than 1. Refer to all important safety instructions that accompanied the transceiver prior to installation. Only laser Class 1 devices certified for use in the country of installation by the cognizant agency are to be utilized in this product. Also, laser warnings are to be provided in accordance with IEC 60825-1 and its Amendments 1 and 2, as well as 21 CFR 1010 and 1040.10(g).

EMI Notices

United States

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The authority to operate this equipment is conditioned by the requirements that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Zhone Technologies, Inc.

Canada

This Class A digital apparatus meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du règlement sur le matérial brouilleur du Canada.

Notice to Users of the Canadian Telephone Network

NOTICE: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation IC before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

NOTICE: The Ringer Equivalence Number (REN) for this terminal equipment is labeled on the equipment. The REN assigned to each terminal equipment provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed five.

If your equipment is in need of repair, contact your local sales representative, service representative, or distributor directly.

CE Marking

When the product is marked with the CE mark on the equipment label, a supporting Declaration of Conformity may be downloaded from the www.zhone.com website.

Product Documentation Online

Complete documentation for this product is available at www.zhone.com.

Contacting Global Service and Support

Contact Global Service and Support (GSS) if you have any questions about this or other Zhone products. Before contacting GSS, make sure you have the following information:

- Zhone product you are using
- System configuration
- Software version running on the system
- Description of the issue

Technical Support

If you require assistance with the installation or operation of your product, or if you want to return a product for repair under warranty, contact GSS. The contact information is as follows:

E-mail	support@zhone.com
Telephone (North America)	877-ZHONE20
Telephone (International)	510-777-7133
Internet	www.zhone.com/support

If you purchased the product from an authorized dealer, distributor, Value Added Reseller (VAR), or third party, contact that supplier for technical assistance and warranty support.

Service Requirements

If the product malfunctions, all repairs must be performed by the manufacturer or a Zhone-authorized agent. It is the responsibility of users requiring service to report the need for service to GSS.

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